Health and
Safety
Commission

Control of lead at work

Revised June 1985

Approved Code of Practice

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First published 1980
Second Edition 1985

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ISBN 0 11 883780 X

Introduction

The primary aim of the Regulations and the Approved Code of Practice is to protect the health of people at work by controlling their exposure to lead and, where such controls cannot reduce exposure to an acceptable low level, to monitor the lead absorption of the individual so that he may be removed from work which exposes him to lead before his health has been affected. The Regulations apply to all work which exposes persons to lead in any form such that it may be ingested, inhaled or otherwise absorbed. Inhalation is the major source of absorption, therefore many of the Regulations are orientated towards preventing the inhalation of lead dust, fume and vapour. Examples of the range of work and substances covered by the Regulations are given in paras 13 and 14 of the Code.

The Regulations contain the fundamental requirements needed to control exposure to lead. Details of acceptable methods of meeting those requirements together with the agreed standards are given in the supporting Code. This approach is intended to leave those who have the duty of complying with the Regulations free to meet the requirements of any individual Regulation by selecting from the range of options given in the relevant section of the Code the method most appropriate to the conditions of the work which they control. In each case compliance with Regulations may be achieved by a method other than that described in the Code but in that case it should be able to be shown that the approach adopted provides as good a standard as the appropriate method in the Code.

The key to the Regulations is a requirement on the employer to assess the nature and extent of the exposure to lead so that, on the basis of that assessment, he may determine the extent of the measures which will be adequate to control the exposure and comply with the Regulations. Where there is significant exposure to lead (see para 10 of the Code) all the Regulations will apply, but below this level only some of the Regulations will apply. In addition the action needed to comply with any individual Regulation will vary according to the degree of exposure. Thus the minimum standards described in the Code are likely to be adequate in the case of low level exposure to lead and the more stringent measures described will be more appropriate to exposure level in the region of the lead-in-air standard (see Appendix 1). Between these two positions the employer will need to select measures appropriate to the degree of exposure to lead.

The basic measure to protect employees from absorbing lead is the prevention of the escape of lead dust, fume or vapour into the workplace and such action should ensure that the amount of lead in the air in the breathing zone of any worker is below the agreed lead-in-air standard. Where the assessment shows that exposure to lead is significant, i.e. above the reference level of half the lead-in-air standard (see para 10 of the Code), then air monitoring is to be carried out on a regular basis to check that the control measures are working effectively and the lead-in-air standard is not exceeded. There will be some work, e.g. maintenance operations, where effective engineering control measures are not reasonably practicable and in these cases a high standard of personal protection is necessary, including the provision of respiratory protective equipment.

Personal hygiene has an important role in controlling lead absorption, thus the provision and use of adequate washing facilities is a basic requirement. In order to avoid risk of lead being ingested, food and drink are not to be consumed in any place liable to be contaminated by lead and the employer is to make adequate arrangements for employees to eat in a clean area. Where there is significant exposure to lead, adequate protective clothing and suitable clothing storage and changing facilities are to be provided.

There is a requirement that employees are given adequate information and training because, in addition to the basic right of an employee to know to what extent he is exposed to lead and what precautions are required, he also needs to know in order that he may carry out the duties which are placed on him by the Regulations. Duties are placed on an employee to use the equipment and facilities provided under the Regulations and to co-operate with the employer in restricting the spread of contamination by lead.

Medical surveillance is required in cases where there is significant exposure to lead to ensure that an individual employee does not come to harm. As part of medical surveillance, regular biological testing is to be carried out to detect any absorption of lead before clinical effects become evident. The results of biological tests may also be used to show that the control measures are effective in keeping lead absorption down to an acceptable level.

The spread of contamination from the workplace is related both to process control measures and to the standard of general cleanliness. Adequate steps are to be taken to control such spread of contamination, thus giving protection to people in adjacent workplaces and also to people in the neighbourhood. So far as the latter are concerned, the aim is that the Regulations, taken together with other legislation for the control of the general environment, should be adequate to prevent health being put at risk from industrial sources.

A certain amount of record keeping is called for, but a flexible approach has been adopted so that records may be kept in a form which best suits the particular circumstances.

Low level exposure to lead

Many of the work activities, e.g. those described in para 14 of the Code, which come within the scope of the Regulations will expose people to only low levels of lead. In such cases compliance will entail carrying out an assessment of the level of exposure, informing the workforce of the results of the assessment, together with information on any relevant precautions, and maintaining a good standard of washing facilities and precautions relating to the prevention of ingestion. In cases where the low level of exposure is achieved by engineering and process control measures, compliance will also entail the maintenance of those control measures. The assessment itself will in many instances amount to no more than an informed judgement based on the guidance given in paras 13 and 14 of the Code.

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Notice of approval of the Code of Practice for the Control of Lead at Work by the Health and Safety Commission

By virtue of Section 16(1) of the Health and Safety at Work etc. Act 1974 and with the consent of the Secretary of State for Employment the Health and Safety Commission has on 4 June 1985, revised the Code of Practice entitled 'Control of Lead at Work', which was approved by the Commission on 14 October 1980.

The Code of Practice gives practical guidance with respect to The Control of Lead at Work Regulations 1980 (SI 1980 No. 1248).

The Code of Practice comes into effect on 1 January 1986.

Signed

C. JOHNSON

Secretary to the Health and Safety Commission

15 August 1985

Approved Code of Practice for the Control of Lead at Work Regulations (SI 1980 No. 1248)

Preface

This Code of Practice was originally drawn up on the basis of joint discussions between representatives of the Confederation of British Industry, the Trades Union Congress, the Local Authorities, independent experts and the Health and Safety Executive under the auspices of the Health and Safety Commission's Advisory Committee on Toxic Substances and has subsequently been amended in order to implement the requirements of the Directive (82/605/EEC) adopted by the Council of the European Communities on the protection of workers from the risks related to exposure to metallic lead and its ionic compounds at work.

The Code has been approved by the Health and Safety Commission, with the consent of the Secretary of State, under Section 16 of the Health and Safety at Work etc. Act 1974 for the purpose of providing practical guidance with respect to the provisions of the Control of Lead at Work Regulations 1980 (SI No. 1248).

Although failure to comply with any provision of this Code is not in itself an offence, that failure may be used in criminal proceedings as evidence that a person has contravened a Regulation to which the provision relates. In such a case however it will be open to that person to satisfy the court that he has complied with the Regulation in some other way.

Words and expressions which are defined in the Health and Safety at Work etc. Act 1974 or in the Control of Lead at Work Regulations 1980 have the same meaning in this Code unless the context requires otherwise.

Each section of the Code gives practical guidance on a specific regulation, the number, title and content of which appear at the heading of each section.

Citation and commencement

Regulation 1

These Regulations may be cited as the Control of Lead at Work Regulations 1980 and shall come into operation on 18 August 1981.

Interpretation

Regulation 2

(1) In these Regulations unless the context otherwise requires—
"adequate" means adequate having regard only to the nature and degree of exposure to lead;
"lead" means lead (including lead alloys, any compounds of lead and lead as a constituent of any substance or material) which is liable to be inhaled, ingested or otherwise absorbed by persons except where it is given off from the exhaust system of a vehicle on a road within the meaning of section 196(1) of the Road Traffic Act 1972.

(2) Any reference in these Regulations to either—
(a) an employee being exposed to lead; or
(b) any place being contaminated by lead;
is a reference to exposure to or, as the case may be, contamination by lead arising out of work being carried on by the employer.

(3) In these Regulations, unless the context otherwise requires—
(a) a reference to a numbered Regulation or Schedule is a reference to the Regulation of or Schedule to these Regulations so numbered; and
(b) a reference to a numbered paragraph is a reference to the paragraph so numbered in the Regulation in which that reference appears.

1 The Regulations apply to work which exposes persons (both employees and other persons) to lead as defined in Regulation 2(1) (i.e. to the metal and its alloys, to compounds of lead, which will include both organic and inorganic compounds, and to lead as constituent of any substance or material) when such lead is in a form in which it is liable to be inhaled, ingested or otherwise absorbed by persons.

2 In practice this means that the Regulations will apply to any work from which lead arises:
(a) in the form of lead dust, fume or vapour which is liable to be inhaled;
(b) in any form in which it is liable to be ingested, e.g. lead powder, dust, paint or paste;
(c) in the form of lead compounds which are liable to be absorbed through the skin, e.g. concentrated lead alkyls.
The work will include any type of work activity, e.g. handling, movement, storage, processing, disposal, repairing, maintenance etc.

Otherwise the Regulations will not be applicable. Thus they will not apply to work with materials or substances containing lead when the work is such that lead cannot be inhaled, ingested or absorbed by persons, as in the handling of finished articles containing lead, e.g. pottery.

3 The extent to which the Regulations apply to any specific work activity will depend on the nature and degree of the exposure to lead. A reference level for significant exposure to lead is given at para 10 of this Code. Where exposure falls below this level the Regulations requiring the provision of protective clothing, air monitoring procedures, medical surveillance and biological testing will not apply.

4 Similarly the extent of the control measures required under individual Regulations will also be related to the level of exposure to lead and, to this end, Regulations 5 to 11 and 15 are qualified by the word 'adequate', meaning adequate having regard to the nature and degree of exposure to lead.

5 The aim is to ensure that the level of protection required by the Regulations in any particular case is appropriate to the nature and degree of the exposure to lead in that case.

Duty of employer to persons at work who are not his employees

Regulation 3

Where any duty is placed by these Regulations on an employer in respect of his employees, he shall, so far as is reasonably practicable, be under a like duty in respect of any other person who is at work on the premises where the work with lead is being carried on and who is, or is liable to be, exposed to lead from that work.

6 The employer has a duty to ensure that he protects not only his employees but also other persons who are engaged on any work at the premises where the employer's work with lead is carried out and which exposes them to lead. These persons would include for example outside maintenance contractors engaged on maintenance of lead plant, or other persons such as contract cleaners, not directly engaged upon work with lead but whose work could expose them to lead. Any employer of these persons will also have duties as an employer under the Regulations and will therefore have to satisfy himself in his own right that adequate precautions are taken to protect his own employees.

Assessment of work which exposes persons to lead

Regulation 4

(1) Where any work may expose persons to lead, the employer or self-employed person, as the case may be, shall assess that work to determine the nature and degree of the exposure to lead.

(2) The assessment required by paragraph (1) shall be made—

(a) in the case of work being carried out immediately before the date of coming into operation of these Regulations within 4 weeks of that date;

(b) in any other case, before the work is commenced.

(3) An assessment shall be revised—

(a) when there is reason to suspect that it is incorrect;

(b) when there is a material change in the work;

(c) when requested by an inspector appointed under Section 19 of the Health and Safety at Work etc. Act 1974.

7 The employer should ensure that the assessment is carried out by a person who is capable of making a competent assessment. That person could be for example a works manager, an occupational hygienist, a medical officer or safety officer and should have received adequate information, instruction and training (see paras 21 to 26). The self-employed person should either carry out the assessment himself or engage a person to do it on his behalf.

8 The work to be assessed should be any work (handling, movement, storage, processing manufacturing, repairing, maintenance work, demolition, disposal, etc) which exposes persons to lead that is liable to be inhaled or ingested and to lead that is liable to be absorbed through the skin, e.g. concentrated lead alkyls.

9 The exposure to be considered by the employer should be the exposure of:

(a) those employees employed upon work with lead and other employees, not so employed, who could be affected by that lead work;

(b) persons other than his employees, who are doing work on his behalf which exposes them to lead, e.g. outside contractors maintaining lead plant;

(c) other persons not in his employment who may be affected by the work activity, e.g. persons living near the workplace who may be affected by emission of lead dust and fume from that workplace and the families of persons exposed to lead at work who may be affected by lead carried home on clothing and footwear. As there may be relevant information available from the local authority, e.g. an assessment of the amount of lead to which the general public in the area is exposed, there should be close liaison between the employer and the local authority (see para 73).

The exposure to be considered by the self-employed persons should be the exposure of any persons such as other workers and members of the public who may be affected by the way he carries out his work with lead.

10 The exposure of persons at work should be considered significant if:

(a) they are exposed to levels of airborne lead which are or are liable to be in excess of half the lead-in-air standard (see Appendix 1 for the lead-in-air standard);

(b) there is substantial risk of ingesting lead;

(c) there is risk of skin contact with concentrated lead alkyls.

Where biological monitoring carried out as part of the assessment reveals a blood lead level of greater than 40 μg per 100 ml or in the case of workers exposed to lead alkyls a urinary lead level of greater than 120 μg/litre in any individual worker, the worker concerned should be regarded as significantly exposed to lead. Where exposure of persons to lead is intermittent, e.g. a few hours a week, and such exposure is in excess of half the lead-in-air standard that exposure may be regarded as insignificant for the purposes of medical surveillance if the exposure level is below the lead-in-air standard (see Appendix 1) and in addition is below half the lead-in-air standard when averaged over a notional 40-hour week.

Lead can be ingested inadvertently but the risk should only be regarded as substantial if the lead work is such that a person's hands or face are liable to be considerably contaminated by lead which can then be ingested.

11 The results of an individual's overall exposure to lead from inhalation, ingestion or skin absorption are best measured by means of suitable biological tests which measure the amount of lead absorbed by an individual or its biological effects.

12 The method of assessment should be chosen to suit the particular work situation but the assessment should include:

(a) consideration of whether the type of work with lead being undertaken is such that exposure is likely to be significant or not using the guidance given in paras 13 and 14;
(b) observations of the work with lead which should be broken down into identifiable units such as mixing, packing, etc;
(c) consideration of any relevant information about:
   (i) the record of lead absorption as indicated by suitable biological tests and any record of substantiated lead poisoning;
   (ii) the lead-in-air concentrations to which persons are exposed to work.

13 There are some types of lead work where significant exposure to lead will occur unless adequate controls are provided. The following Table indicates such types of work and gives some examples of industries and processes where such work could be found. The information in the Table should not be regarded as exhaustive.

Types of lead work where there is liable to be significant exposure to lead (unless adequate controls are provided)	*Examples of industries and processes where such work could be carried out*
Lead dust and fumes	
1 High temperature lead work (above 500 °C) e.g. lead smelting, melting, refining, casting and recovery processes lead burning, welding and cutting	lead smelting and refining; casting of certain non-ferrous metals, e.g. gun-metal; leaded steels manufacture; scrap metal and wire-patening processes of lead coated and painted plant and surfaces in demolition work; ship-building, breaking and repairing; chemical industry; miscellaneous industries.
2 Work with lead compounds which gives rise to lead dust in air (e.g. any work activity involving a wide variety of lead compounds) (other than low solubility lead compounds as defined in Appendix 2)	manufacture of lead batteries, paints and colours, lead compounds, rubber products; certain mixing and melting processes in the glass industry, certain colour preparation and glazing processes in the pottery industry.
	battery breaking.
	manufacture of detonators (explosives industry).
3 Abrasion of lead giving rise to lead dust in air, e.g. dry discing, grinding, cutting by power tools	miscellaneous industries, e.g. motor vehicle body manufacture and repair of leaded car bodies.
	firing of small firearms on indoor ranges.
4 Spraying of lead paint and lead compounds other than paint conforming to BS 4310/68 and low solubility lead compounds (as defined in Appendix 2)	painting of bridges, buildings, etc, with lead paint.
Lead alkyls	
1 Production of concentrated lead alkyls	lead alkyl manufacture.
2 Inspection, cleaning and maintenance work inside tanks which have contained leaded gasoline, e.g. road, rail and sea tankers and fixed storage tanks	oil refineries, oil transport terminals and certain works where tank cars are inspected or repaired.

14 There are some types of work where significant exposure to lead is not liable to occur unless the lead content and/or nature of the lead is altered by the work in such a way that there may be significant exposure to lead, e.g. in cases where, although the lead content is low, the lead is in a finely divided state which may be concentrated during processing. The following Table indicates the types of such work and gives some examples of industries and processes where such work could be found. The information in the Table should not be regarded as exhaustive.

Types of lead work where there is not liable to be significant exposure to lead	*Examples of industries and processes where such work could be carried out*
Lead dust and fumes	
1 Work with galena (lead sulphide)	mining and working of galena when its character or composition is not changed.
2 Low temperature melting of lead (below 500 °C) (Such low temperatures control the fume but some care is still required in controlling any dust from dross)	plumbing; soldering; linotype and monotype casting processes in printing industry.
3 Work with low solubility inorganic lead compounds (when tested for low solubility as defined in Appendix 2)	painting with low solubility paints.
4 Work with materials which contain less than 1% total lead	
5 Work with lead in emulsion or paste form where the moisture content is such and is maintained so that lead dust and fume cannot be given off throughout the work duration	brush painting with lead paint and the use of some stabilisers for plastics.
6 Handling of clean solid metallic lead, e.g. ingots, pipes, sheets, etc	miscellaneous metal industries, stock-holding, general plumbing with sheet lead.
7 Lead emissions from petrol driven vehicles (other products of combustion such as carbon-monoxide are the major risk)	testing of petrol driven engines.
Lead alkyls	
1 Any exposure to lead alkyl vapours from leaded gasoline where the lead content is limited under the Motor Fuel (Lead Content of Petrol) Regulations	work with such leaded gasoline including, e.g. the filling of petrol vehicles on garage forecourts (except for work inside tanks which have contained fuel) (Lead Content leaded gasoline as listed in para 13 above).

15 The guidance given in paras 13 and 14 is not exhaustive as the nature of exposure will vary in different work situations but it should be used as a practical guide for assessment purposes.

16 Measurements such as lead-in-air estimations and the sampling of lead-bearing materials need not be carried out at the initial assessment when:
(a) exposure to lead can be accepted as significant or insignificant on the basis of the guidance given in paras 13 and 14;
(b) sufficient written information based on measurements is already available about lead-in-air concentrations, e.g. in relation to a particular class of plant such as casting machines in the printing industry or in relation to a specific work activity which enables an adequate assessment of exposure to be made;
(c) sufficient and suitable written information is available or has been obtained from manufacturers or suppliers of lead-bearing materials about their solubility and percentage lead content, e.g. of lead paints and colours.

17 Any lead-in-air monitoring which is carried out should be done in accordance with paras 88 to 102 and the records completed as soon as possible.

18 In assessing the work in relation to the exposure to lead of persons other than those at work, all sources of lead giving rise to potential contamination outside the workplace should be identified so that action may, where necessary, be taken. Such action should be taken under the appropriate specific legislation, e.g. the Alkali and Public Health Acts, or, where this is not applicable under Regulation 12 and paras 66 to 73 of this Code.

19 A material change in the work activity should be one where the process, plant or method of work is altered in such a way that the alteration is likely to affect the nature of the hazard, e.g. the raising of working temperatures for molten lead or changes in the exhaust ventilation system or changes in work layout without a corresponding change in the ventilation system.

20 Reasons to suspect that the assessment is incorrect should include any material change as outlined above, increased or excessive lead absorption in people working in areas where such absorption on the basis of the original assessment would have appeared to be unlikely.

Information, instruction and training

Regulation 5

Every employer shall ensure that adequate information, instruction and training is given to his employees—

(a) who are liable to be exposed to lead so that they are aware of the risks from lead and the precautions which should be observed;

(b) who carry out any work in connection with the employer's duties under Regulations 4, 11, 13, 14 and 15 so that they can carry out that work effectively.

21 The information, instruction and training given to employees including those employees who have duties under Regulation 5(b) and those with supervisory functions should have the objective of familiarising them as appropriate with:

(a) the health hazards of lead;

(b) the reasons for the nature of both the general control measures, etc, which are required to protect themselves and other persons including their families who may be affected by their work with lead and the specific control measures, etc, which are necessary in relation to each employee's own job;

(c) how the control measures, etc, should be used if they are to be effective, e.g. the correct way of using respiratory protective equipment;

(d) the significance of air and biological monitoring;

(e) the role of medical surveillance;

(f) their duties under the Regulations with particular emphasis on:

  (i) the need for correct use of the control measures, etc, provided including personal protective equipment;

  (ii) the need for cleanliness and to practise a high standard of personal hygiene;

  (iii) the need to attend at the appointed time for medical examinations and biological tests;

  (iv) the need to report any defects or inadequacies in the control measures which could affect the health of persons.

22 Employees and their representatives should be informed as quickly as possible of the results of any lead-in-air monitoring which shows levels above the lead-in-air standard and the reasons for the excess. Where emergency measures have been taken to control the effects of such an excess, employees and/or their representatives should be informed of the measures taken.

23 The leaflet *Lead and You* should be distributed by the employer to each employee on his first employment on work with lead and copies should be made available for issue at the request of an employee or his representative.

24 Any person who carries out any assessment, maintenance and air monitoring tasks under Regulations 4, 14 and 15 which require the use of instruments should be given additional information, instruction, training as appropriate on:

(a) the object of using instruments;

(b) the correct use of instruments;

(c) sampling techniques;

(d) the analysis, interpretation and recording of results.

25 The information, instruction and training should be considered adequate when all the objectives given in paras 21 to 24 are met.

26 The methods used to achieve these objectives should preferably be integrated with and be a normal part of any information, instruction and training which is given to enable persons to carry out their job function, for example as part of practical training on how to use particular plant or equipment. In some cases formal training by means of seminars, lectures and discussion groups could be appropriate whereas in other cases on the job training by a knowledgeable supervisor could be more suitable. Refresher training should be given as appropriate to ensure that the overall objectives are attained.

Control measures for materials, plant and processes

Regulation 6

Every employer shall, so far as is reasonably practicable, provide such control measures for materials, plant and processes as will adequately control the exposure of his employees to lead otherwise than by the use of respiratory protective equipment or protective clothing by those employees.

27 The control measures for materials, plant and processes should be considered adequate when they effectively control the exposure of employees to:
(a) lead-in-air concentrations not exceeding the lead-in-air standard (see Appendix 1 for the lead-in-air standard and its interpretation);
(b) lead which can be ingested;
(c) lead which can be absorbed through the skin (e.g. concentrated lead alkyls).

28 The measures adopted to control such exposures should include where appropriate and reasonably practicable the use of one or more of the following:
(a) substitution by lead free materials or low solubility lead compounds as defined in Appendix 2;
(b) the use of lead or lead compounds in emulsion or paste form to prevent or minimise the formation of dust;
(c) the use of temperature controls to control the temperature of molten lead to below 500 °C at which levels fume emission is insignificant. (But it should be noted that the formation of lead oxide and the emission of dust is still possible below this temperature);
(d) the containment of lead in totally enclosed plant and in enclosed containers such as drums and bags. The enclosure should not allow lead to leak out and where opening of the enclosure is required, this should be done under exhaust ventilation where reasonably practicable;
(e) where total enclosure is not reasonably practicable, an effective exhaust ventilation system which should normally consist of:
(i) partial enclosures such as booths which enclose the lead at source and prevent its escape outside the enclosure by the application of an exhaust draught;
(ii) various types of hoods which are used when it is not reasonably practicable to enclose the source of pollution. The air movement in the hoods should entrain the lead dust, fume or vapour and carry it into the exhaust system.
To be effective these hoods should be placed as near as practicable to the point of origin of the lead dust, fume or vapour and draw the dust, fume or vapour away from any person's breathing zone;
(iii) ductwork with an airflow of adequate conveying velocity;
(iv) a dust and/or fume collection unit with filtration or arrestment equipment as necessary. Lead contaminated air from the exhaust system should not be discharged after filtration from the system into:
(1) work areas unless the concentration of lead in the exhaust air is less than one-tenth of the lead-in-air standard (see Appendix 1 for the lead-in-air standard);
(2) other areas such as the general environment unless it has been adequately treated (see paras 66 to 73);
(v) fans or other air movers of a suitable type for the system which should be placed in the system after the collection and filtration unit so that the unit is kept under negative pressure thus minimising the escape of lead.
(f) where, as a result of an incident, there is likely to be a substantial increase in exposure to lead, those workers whose presence is not essential should be excluded from the affected area. Those workers whose presence in such an area is

required should wear protective clothing and respiratory protective equipment appropriate to the risk (see paras 35 and 39).

(g) wet methods which include:
  (i) the wetting of lead and lead materials, e.g. wet grinding and pasting processes. Wet methods should be used for rubbing or scraping down lead painted surfaces;
  (ii) the wetting of floors and work benches while work is being carried out, e.g. certain work with dry lead compounds and pasting processes in the manufacture of batteries.

The wetting should be thorough enough to prevent the formation of dust and the wetted materials or surfaces should not be allowed to dry out as this can create dry lead dust which is liable to be hazardous if it becomes airborne (see also para 61). Water sprays should not normally be used to control an airborne dust cloud as they are unlikely to be effective.

Wetting should not be used where such methods are liable to be unsafe, e.g. at furnaces where the use of wet methods could constitute an explosion risk. Neither should wetting be used where lead materials containing arsenides or antimonides could on contact with water evolve arsine or stibine gases.

29 The control of lead in the workplace should not be at the expense of the external environment which is controlled by other legislation and where emissions of lead dust, fume or vapour to the general environment may occur there should be consultation with the appropriate responsible authority (see Appendix 4).

30 Special attention should be given to the design of plant and systems of work so as to eliminate or reduce persons' exposure to lead. Care should be taken to avoid external ledges on plant on which lead dust can settle; plant surfaces should be smooth and impervious so far as is reasonably practicable to facilitate cleaning; good joints and seals should be provided to prevent leakages. In particular when new plant is commissioned, checks should be made to ensure that design specifications are in fact adequate for the specific work activity and that compliance can be achieved under full production operating conditions. It is desirable that the design of ventilation plant should be carried out by ventilation specialists.

31 Control measures should always be set in the context of the total work environment with the aim of reducing exposure to lead through all stages of the work cycle. Particular attention should be given to methods of work, e.g. when exhaust booths are used for weighing out lead material attention should be given to how the material is brought to the booth and how it is handled after work has been completed inside the booth, as it is not sufficient to concentrate only on one aspect of the work to the neglect of other aspects which can be equally hazardous.

32 Control measures should be in accordance with the requirements of the Regulations and, so far as is reasonably practicable, with the current best practices.

Respiratory protective equipment

Regulation 7

Every employer shall provide each employee who is liable to be exposed to airborne lead with such respiratory protective equipment of a type approved in writing by the Health and Safety Executive as will adequately protect him against that airborne lead unless the control measures adopted in compliance with Regulation 6 provide him with adequate protection.

33 Approved respiratory protective equipment should be provided for any person who is exposed to airborne concentrations of lead in his breathing zone in excess of the lead-in-air standard (see Appendix 1 for the lead-in-air standard).

34 The objective should be to reduce lead-in-air concentrations by means of control measures for materials, plant and processes so as to eliminate the need to wear respiratory protection. There are however certain situations, e.g. some maintenance operations, work in bag houses, etc, where respiratory protective equipment will always be required.

35 Selection of respiratory protective equipment should be based upon:
(a) the extent of the airborne hazard as indicated by air monitoring;
(b) the nature of the hazard;
(c) the standard of protection afforded by different types of respiratory equipment as stated in the terms of approval by the Health and Safety Executive;
(d) work requirements and conditions, e.g. the length of time the equipment is to be worn, the type of work to be done;
(e) facepiece fit for the wearer.

36 Arrangements should be made to ensure that no person uses respiratory protective equipment which has previously been used by another person unless it has been thoroughly washed and cleaned (see paras 60 and 62).

37 All respiratory protective equipment should be properly maintained (see paras 77 to 87).

38 For each operation in which it can be foreseen that it will not be reasonably practicable to control the airborne dust and vapours to which a person is exposed to the lead-in-air standard, the employer should specify the type of approved respiratory protective equipment which should be worn to ensure adequate protection.

Protective clothing

Regulation 8

Every employer shall provide each employee who is liable to be exposed to lead with adequate protective clothing unless the exposure to lead is not significant.

39 The protective clothing should help to reduce exposure to lead by protecting personal clothing and the body from contamination by lead and help prevent the spread of lead by reducing the chance of contaminated clothing being taken home. The type and the design of the clothing and the material from which it is made will be governed by the nature and amount of lead to which the employees are exposed; this should be indicated by the results of the assessment made under Regulation 4. Where exposure to lead exists in conjunction with hazards such as molten metal, corrosives, wet processes or bad weather, then these should be taken into account and a balance achieved to afford the best protection that is reasonably practicable.

40 In many cases normal overalls should give adequate protection provided that they are in good repair and are kept clean (see para 60). Where there is no accumulation of lead dust on the floor it is unlikely that protective footwear would be required by virtue of these Regulations. Protection for the face and hands should not normally be considered necessary but is essential for the prevention of skin absorption of lead alkyls and some other organic lead compounds which can be absorbed through the skin if they are used in certain carrier media.

41 If outer protective clothing, e.g. boiler suit or overalls, cannot be worn in such a way that the clothing underneath is not contaminated by lead, then such clothing should be classified and issued as protective clothing. Similarly, if additional clothing is required, e.g. for outdoor work in bad weather, then if that clothing is worn on top of the overalls, it too should be classified and issued as protective clothing.

42 Where the assessment indicates that the amount of lead to which employees are liable to be exposed is such that normal overalls would not afford adequate protection, then the selection of the protective clothing should take into account:
(a) the ability of the material to resist penetration by lead dust;
(b) the dust release characteristics of the material;
(c) the design of the clothing, e.g. close fitting at neck and arm openings.

43 For lead alkyls where the work presents risk of skin contact, impermeable protective clothing is essential. For certain maintenance operations and entry into vessels which have contained lead alkyls such clothing should afford full protection and could comprise for example an air-supplied suit and helmet or hood together with suitable footwear.

44 Protective clothing and footwear should be issued on a personal basis or job basis as appropriate and should be clearly identifiable so that it can be easily sorted and correctly allocated after cleaning or repair. For most items of clothing at least two sets should be provided; one to wear and one for cleaning and/or repair with more sets being issued as appropriate.

Washing and changing facilities

Regulation 9

Every employer shall provide for his employees who are liable to be exposed to lead—
(a) adequate washing facilities; and
(b) where he is required under Regulation 8 to provide protective clothing, adequate changing facilities and adequate facilities for the storage of—
  (i) that protective clothing; and
  (ii) personal clothing not worn during working hours;
  so however that this Regulation shall not apply during the period of 12 months after the coming into operation of these Regulations where in order to comply with this Regulation it would be necessary to erect a new building or make substantial structural alterations to a building.

45 The washing and changing facilities should enable persons at work to meet a high standard of personal hygiene so as to minimise the risk of them ingesting or otherwise absorbing lead. The design of the washing facilities should be related to the nature and degree of exposure to lead as indicated by the assessment carried out under Regulation 4. Where there is significant exposure of persons to lead (see para 10) and if wash basins alone would not be adequate, the washing facilities should include showers or baths, e.g. where work is carried out in dusty conditions which could result in whole body contamination by lead, then the provision of showers or baths would be essential.

46 Where a need is indicated by the assessment, special attention should be paid to the location of the facilities to prevent the spread of contamination by lead from protective clothing to personal clothing and from one facility to another. This should be achieved by:

(a) separation of the changing and storage accommodation for protective clothing, protective footwear and respiratory protective equipment from that for personal clothing and footwear not worn during working hours by means of having separate rooms or having rooms divided into clean (personal clothing and) dirty (protective clothing) areas. Personal clothing should not be allowed in the dirty room or area and protective clothing should not be allowed in the clean room or area. The separation of a room into clean and dirty areas should only be considered acceptable when the standard afforded is similar to that which would be achieved by the use of separate rooms.

(b) where space permits and where the risk of contamination cannot be otherwise effectively controlled, the washing and shower facilities should be integrated with the clothing and changing accommodation so that they are located between the facilities for personal clothing and those for protective clothing to enable:
  (i) persons to remove lead contaminated clothing and footwear in one room or area;
  (ii) then to pass into the washing and bathing area; and
  (iii) finally pass into the clean room or area where they can put on clean clothing and footwear.

47 For certain types of work, such as lead work carried out at premises or sites where such work is not regularly done, e.g. certain tank cleaning and lead burning operations, mobile caravan-type facilities of suitable design should be provided. Such facilities could also be considered for use in premises where space for further buildings is limited.

48 The facilities should be laid out, so far as is practicable, to encourage the correct directional flow of persons between the facilities and avoid congestion.

Consideration should be given to their location in relation to other facilities such as clothing issue rooms, drying rooms, refreshment facilities and clocking-on points so as to minimise the spread of contamination and also to enable the facilities to be conveniently used.

49 Attention should also be paid to design features. Walls, ceilings, floors, wash basins, baths and showers should have smooth impervious surfaces which can be easily washed or cleaned and which cannot trap lead and dirt in corners and crevices. Smooth painted washable surfaces, ceramic surfaces and stainless steel surfaces should be considered suitable.

50 In the clothing accommodation, sufficient lockers, baskets, hangers, hooks or other storage appliances should be provided to cope with the clothing of the maximum number of persons who will require the use of the accommodation. Adequate provision should be made for any outside contractors or visitors who may be exposed to lead arising from the work activities.

51 The washing and shower facilities should be supplied with:
(a) wash-basins of sufficient dimensions to enable arms to be immersed up to the elbow;
(b) a constant supply of running hot and cold or warm water;
(c) soap or other cleaning materials;
(d) nail-brushes;
(e) individual towels or other means of drying.

Towels dispensed from roller towel machines should be considered suitable as long as they afford a clean drying surface for each person. Communal towels should not be provided.

52 The number of wash-basins, showers or baths provided should enable the maximum number of persons expected to use them at any one time to do so without undue delay. Account should be taken of starting and finishing times and the time available for the use of the facilities. For persons significantly exposed to lead at work and expected to use the facilities at any one time there should be provided:
(a) (i) one wash-basin for every 5 persons, or
    (ii) 600 mm of trough for every 5 persons;
(b) (i) one shower or bath for every 5 persons who may be expected to shower or bath daily at one time;
    (ii) an adequate number of showers or baths for people such as maintenance staff and cleaners who are likely to do occasional dirty jobs which may expose them to a high degree of contamination.

Eating, drinking and smoking

Regulation 10

(1) Every employer shall take such steps as are adequate to secure that—
    (a) so far as is reasonably practicable, his employees do not eat, drink or smoke in any place which is or is liable to be contaminated by lead;
    (b) suitable arrangements are made for such employees to eat, drink or smoke in a place which is not liable to be contaminated by lead.

(2) An employee shall not eat, drink or smoke in any place which he has reason to believe to be contaminated by lead.

(3) Nothing in this Regulation shall prevent the provision and use of drinking facilities which are not liable to be contaminated by lead where such facilities are required for the welfare of employees who are exposed to lead.

53 The objective of this Regulation is to reduce the risk of ingestion of lead by ensuring that employees do not eat, drink or smoke in places which are contaminated by lead arising from work activities.

54 Suitable arrangements for employees to eat, drink or smoke in a place which is not contaminated by lead will vary according to circumstances. Where exposure to lead is liable to be significant (see para 10), suitable arrangements for use where persons remain at their workplace during main meal intervals should consist of a canteen, mess-room or other suitably designated clean eating area. Whenever it is reasonably practicable, such facilities should be provided with suitable tables and chairs and suitable facilities for the storage of food and drink, whether the food and the drink is supplied by the employer or the employees. In order to reduce the risk of contamination of the facilities and of the food and drink, persons should remove contaminated clothing and wash before partaking of food and drink; the relative locations of the eating and drinking arrangements and the washing and changing accommodation should be such as to facilitate meeting this objective. Where exposure to lead is not significant any clean area located away from where lead work activities are carried out would be acceptable.

55 Where exposure of persons to lead is liable to be significant, it should be considered that additional drinking facilities are required for the welfare of employees when it is not reasonably practicable to use the main facilities for short breaks such as tea breaks. Under these circumstances vending machines dispensing only liquid refreshment in disposable containers may be provided. If such machines are used, they should be so designed, located and controlled that both the drink and the container are protected against contamination by lead. They should also be located near washing facilities so that employees may wash their hands and faces before drinking. If drinking fountains are provided they should be similarly so designed, located and controlled as to protect the water against contamination by lead.

56 A duty is placed on the employer to give adequate information to his employees so that they are aware of the areas in which eating, drinking and smoking should not be carried out (see para 21 and Regulation 5). An employee should have reason to believe a place is contaminated by lead when he has been informed by the employer that lead is being used in that place or that the place may be contaminated by lead which is being used in adjacent areas.

57 In relation to the employee's duty not to eat in any place where there is risk of contamination by lead, eating should be taken to include the chewing of gum.

Cleaning

Regulation 11

Where an employee is liable to be exposed to lead, the employer shall take adequate steps to secure the cleanliness of work places, premises, plant, respiratory protective equipment and protective clothing.

58 Workplaces and premises should include:
(a) areas in which lead is liable to be present;
(b) changing and clothing accommodation;
(c) washing and bathing facilities;
(d) eating and drinking facilities.

59 Adequate steps should include:
(a) having a procedure for cleaning and that procedure should specify:
    (i) the name or job status (e.g. shift foreman) of the person responsible for overall supervision of the cleaning procedure;
    (ii) the area, plant, equipment or clothing to be cleaned;
    (iii) the minimum frequencies for such cleaning;
    (iv) the method of cleaning;
(b) providing, particularly in areas where lead dust is liable to accumulate, smooth and impervious surfaces for floors, inside walls, ceilings, workbenches and external surfaces of plant, so that cleaning is facilitated.

60 The cleaning should be done as frequently as is necessary to secure cleanliness and the removal of lead deposits thus reducing the risk of inhalation and ingestion of lead. In particular the following should be cleaned at the minimum frequencies given below:

(a) floors and workbenches at least once a day;
(b) external plant surfaces where readily accessible once a day;
(c) respiratory protective equipment at the end of every shift or work period;
(d) protective clothing should be washed, cleaned or renewed at least once a week; and
(e) washing and changing facilities and facilities for eating and drinking should be washed, cleaned, etc, at least once a day.

The frequency of cleaning inside walls and ceilings will vary according to the degree of contamination. Overhead ledges and other fixtures should be cleaned as frequently as necessary to prevent the accumulation of lead deposits which can be dislodged and become airborne.

61 The methods of cleaning should not create a risk from lead to the cleaners or other persons or spread contamination. Acceptable methods include:

(a) wet cleaning;
(b) the use of mobile or fixed vacuum cleaning apparatus equipped with high-efficiency filters.

When wet cleaning is carried out care should be taken to ensure that surfaces are kept free from wet sludge which could be transferred by internal transport systems to other lead free areas and which, if it dries out, can create a substantial amount of airborne dust. Dry brushing and sweeping methods should not be used to remove lead dust.

62 Respiratory protective equipment should be thoroughly washed and cleaned in accordance with the maker's instructions.

63 Protective clothing (as required by Regulation 8) and towels should preferably be cleaned at the premises where work with lead is carried out. If protective clothing and towels are sent to outside agencies for cleaning, the agencies should be alerted to the lead risk and the need to ensure that cleaning is carried out without risk to employees. Protective clothing and towels should not be taken home by employees for cleaning.

64 When lead contaminated clothing is sent out for cleaning it should be placed in suitable impermeable containers or bags which should be labelled 'lead contaminated clothing'. Where in-plant laundering is carried out arrangements should be made which are sufficient to prevent spread of contamination.

65 The employee who carries out a particular job should in general be made responsible for the clearance of any spillages from it.

Duty to avoid spread of contamination by lead

Regulation 12

(1) Every employer, his employees and every self-employed person shall, so far as is reasonably practicable, prevent the spread of contamination by lead from the place where work is being carried out.
(2) Nothing in paragraph (1) shall prejudice any other requirements imposed by or under any enactment which relates to preventing the spread of contamination by lead.

66 The objective should be to prevent lead, so far as is reasonably practicable, being spread outside lead work areas resulting in the exposure to lead of:

(a) other employees not engaged on lead work;
(b) other persons such as the families of employees and the general public.

67 This objective should be achieved by:

(a) the control and containment of lead in the areas where it is worked;
(b) the control of all lead emissions from these areas by whatever means they are carried, e.g. air, water, vehicle wheels, etc.

68 The control measures required under Regulations 6 to 11 should if properly used and maintained contain most of the lead within lead work areas. Areas where there is a significant risk of contamination should be suitably demarcated from other areas, for example by means of the use of separate rooms or of clearly identifiable layouts. Lead should be contained within these demarcated areas which should cover every aspect of the work from the storage of the raw materials to the despatch of the finished product.

69 Airborne emissions from demarcated lead work areas, such as from production plant or exhaust ventilation systems, should be controlled by limiting the amount of lead discharged, for example by the use of process controls, filtration or arrestment plant. Such controls should, where relevant, be in accordance with the legislation governing emissions to the external environment. For details of this legislation, viz. the Alkali, etc, Works Regulation Act, the Public Health and the Clean Air Acts, and its administration, see Appendix 4. For information on the recirculation of filtered air to work areas, see para 28(e)(iv).

70 Waterborne emissions should be controlled in accordance with the requirements of the relevant legislation (see Appendix 4).

71 Other sources of contamination should be controlled in particular by:
(a) high standards of cleanliness;
(b) the decontamination of lead contaminated plant, containers, tools, transport vehicles, etc, by suitable methods such as water washing before they leave the premises where lead work is carried out. Special attention should be paid to the washing of wheels and wheelarches of transport vehicles;
(c) preventing loss of material, by sheeting or other methods, from vehicles transporting lead in a form liable to spill on to roadways or to release dust to the atmosphere;
(d) the safe collection and disposal of lead waste (reference to the specific legislation relating to the disposal of waste is given in Appendix 4);
(e) giving careful attention to land routes such as internal roadways, yards and passageways which should have hard even surfaces which can be kept clean;
(f) locating the washing and changing facilities, where reasonably practicable, so as to ensure that persons leaving work do not have to pass through lead contaminated areas after using the facilities;
(g) taking steps to ensure that employees do not carry lead outside the premises on their persons, clothing, socks, footwear, etc (see para 63).

72 Employees should:
(a) use any control measures provided to prevent the spread of contamination by lead;
(b) take particular care to practise a high standard of personal hygiene and use the hygiene controls provided so that lead is not taken outside the premises on any part of their bodies and clothing including socks and footwear as this could put their families at risk;
(c) ensure that contaminated clothing and towels are not taken home to be laundered or for any other reason.

73 When there is reason to suspect that lead workers' families or other members of the public may be affected by lead arising from work activities, employers should maintain a close liaison with local authorities who have wide responsibilities for maintaining public health.

Use of control measures etc.

Regulation 13

(1) Every employer who provides any control measures, respiratory protective equipment, protective clothing or other thing or facility pursuant to Regulations 6 to 12 shall ensure, so far as is reasonably practicable, that it is properly used or applied as the case may be.

(2) Every employee shall make full and proper use of any control measure, respiratory protective equipment, protective clothing or other thing or facility provided pursuant to Regulations 6 to 12; and if he discovers any defect therein he shall report it forthwith to his employer.

74 There should be procedures for ensuring that control measures are properly used or applied and these should be part of the normal supervisory function. Procedures will therefore vary but they should include:

(a) visual checks at least once a shift where appropriate;
(b) note of when and where the control measures are not being properly used or applied;
(c) the institution of prompt remedial action.

75 Employees should use the control measures in the way they were intended to be used, e.g. if an exhaust booth is provided, the work should be done inside the booth where it is under the influence of the exhaust draught.

76 Employees should in particular:

(a) use the control measures provided for materials, plant and processes;
(b) wear in the proper manner respiratory protective equipment and protective clothing provided when the control measures for materials, plant and processes cannot provide adequate protection. Any clothing such as cardigans and pullovers should not be worn on top of protective clothing;
(c) keep the respiratory protective equipment and protective clothing only in the accommodation provided for them and not elsewhere. Protective clothing should not be kept in the accommodation for personal clothing not worn during working hours and personal clothing should not be kept in the accommodation for protective clothing;
(d) remove protective clothing before eating and drinking at main meal breaks and on other occasions if it is likely that lead on the protective clothing could contaminate the food, drink and related facilities;
(e) remove protective clothing and place it in the accommodation provided for it before leaving the premises where work with lead is carried out;
(f) make proper use of the washing facilities:
    (i) before eating, drinking, smoking or carrying out any activity which could cause lead to be ingested; and
    (ii) before leaving the premises to prevent lead being carried outside the premises;
(g) make proper use, before leaving the premises, of any shower or bath facilities provided under Regulation 9 if they are employed in jobs where there is a high risk of bodily contamination;
(h) keep the place of work clean and co-operate fully in relation to the cleaning procedures adopted;
(j) use the canteen, messroom or other eating and drinking facilities provided and in particular use any facilities provided for the storage of food and drink which should not be kept or stored in lead contaminated areas.

Maintenance of control measures etc.

Regulation 14

Every employer who provides any control measure, respiratory protective equipment, protective clothing or other thing or facility pursuant to Regulations 6 to 12 shall ensure, so far as is practicable, that it is maintained in an efficient state, in efficient working order and good repair.

77 The object of the maintenance should be to ensure that control measures are effective in protecting persons from lead and that any defects which could result in a loss of efficiency of the controls are detected and remedied.

78 Maintenance in this context should not merely refer to work carried out by maintenance workers engaged for example on plant repair but also to any work which is carried out to secure the efficiency of control measures which may be the responsibility of workers other than maintenance workers.

79 Maintenance procedures should be drawn up to suit the individual work situation but the procedures should be such that it is clear:

(a) what control measures require maintenance;
(b) how the maintenance should be carried out;

(c) when the maintenance should be done;
(d) how any defects disclosed by such maintenance should be remedied;
(e) who is responsible for that maintenance.

80 The control measures to be maintained should include:
(a) materials, plant and process control measures;
(b) respiratory protective equipment;
(c) protective clothing;
(d) washing and changing facilities;
(e) arrangements to ensure that employees do not eat and drink in places which are contaminated by lead;
(f) cleanliness controls;
(g) controls to prevent the spread of contamination.

81 The maintenance methods should include:
(a) visual checks to detect obvious defects in the control measures;
(b) more thorough examination and tests using instruments where appropriate to assess the efficiency of technical controls such as exhaust ventilation systems.

82 The intervals between visual checks and thorough examinations and tests should be determined according to the individual work situation but:
(a) a general visual check should be carried out at least once a week;
(b) respiratory protective equipment should be checked before and after each occasion of use and in addition self-contained and airline breathing apparatus should be thoroughly examined and tested at least once a year by a competent person;
(c) exhaust ventilation equipment should be thoroughly examined and tested at least once a year by a competent person.

Details of training requirements for persons carrying out the examinations and checks are given in paras 21 and 24.

83 The weekly visual check on an exhaust ventilation system should be aimed at identifying obvious defects in the equipment, such as damage, wear, malfunctioning, etc, which could result in ineffective extraction and leakage of lead dust, fume or vapour from the system.

84 The yearly thorough examination and test of an exhaust ventilation system should include:
(a) a thorough examination, both internally and externally where appropriate, of the condition of all parts of the system, i.e. exhaust openings, collection hoods or suction points, ductwork, dust collection and filtration units, fans or air movers;
(b) measurements of static pressure at a point in the duct immediately behind each exhaust opening, collection hood or suction point when the equipment is simultaneously extracting from all points served;
(c) measurements of air velocities at the plane of openings to enclosures, collection hoods or suction points for which standard velocities have been specified;
(d) an assessment of whether or not the lead dust, fume or vapour is being effectively controlled at each exhaust opening, collection hood or suction point. This would be complemented by data on airborne lead concentrations obtained by routine air monitoring referred to in paras 88 to 102.

85 Procedures for remedying defects should include provision for replacement, repair and remedial action within specified time limits which will range from immediate action to action within a few weeks or months dependent on the degree of risk.

86 Checking and maintenance procedures should where feasible be integrated with the normal production activity, e.g. visual checks to detect obvious defects such as damaged protective clothing and leakages from enclosures should be carried out by persons as part of their daily work routine. Some employers might wish to delegate maintenance to supervisors while giving the responsibility for overall supervision of maintenance procedures to one person. Persons with special skills should be made responsible for the thorough examination and tests of breathing apparatus and exhaust ventilation systems.

87 Records should be kept of the monthly examination and test of breathing apparatus and the yearly examination and test of exhaust ventilation plant (see paras 126 to 139). Other records should be kept as appropriate where their keeping is conducive to securing adequate maintenance.

Air monitoring

Regulation 15

Every employer shall—

(a) have adequate monitoring procedures to measure the concentrations of lead-in-air to which his employees are exposed unless the exposure is not significant;

(b) measure the concentration of lead-in-air in accordance with those procedures.

88 The monitoring of employees' exposures to lead should be done by both air sampling (Regulation 15) and biological testing (Regulation 16) where exposures are found to be significant as defined in para 10. These two approaches have complementary roles.

89 Measurements of the concentrations of lead in the air in the breathing zone of employees and in the general workplace atmosphere, with reference to a lead-in-air standard, provide the most direct and suitable basis upon which engineering provisions for the control of airborne lead can be introduced, assessed for effectiveness, improved and monitored for performance. On the other hand, measurements of blood lead or, in the case of alkyls, urinary lead through the biological testing required by Regulation 16 (see paras 103 to 125) provide for each employee, or for a group of employees, an index of lead absorption over a period of exposure. The results of biological testing can thus reflect the effectiveness of hygiene provisions and precautions in general. Complete and effective occupational hygiene practice, where there is significant exposure to lead, thus requires periodic measurements to be made of both lead-in-air concentrations and lead absorption.

General requirements for air monitoring

90 Where exposures to lead are significant, measurements of lead-in-air should be made on a routine basis at suitable intervals:

(a) to check on the concentrations of airborne lead to which employees are exposed;

(b) to check on the continuing efficiency of the engineering and other provisions for the control of releases of lead into the air and to indicate when corrective action is required.

91 Suitable records should be kept of the lead-in-air concentrations determined by air monitoring (see paras 126 to 128).

92 Air monitoring procedures should involve the use of suitable air sampling techniques and strategies for the estimation of 8-hour time weighted average concentrations of lead-in-air on each occasion that measurements are made, to permit comparisons against the lead-in-air standard (Appendix 1). Acceptable techniques and strategies together with methods of analysis are described in a separate Guidance Note.

93 In certain cases it may be necessary to undertake a preliminary air sampling survey in order to provide information for use in drawing up an air monitoring programme. The data obtained from the preliminary survey would be used for deciding, for example, upon the initial frequency of monitoring, upon the number and location of sampling points (both personal and static) and upon the balance between personal and static sampling where both of these methods are used. Where employers have obtained information on employee exposures prior to the introduction of the Regulations there may be sufficient data for the purposes of planning monitoring procedures without the need for a preliminary survey.

Air monitoring procedures

94 Measurements of time weighted average concentrations of lead-in-air for monitoring purposes may be made by personal sampling, by static sampling or by a combination of both methods. If static sampling alone is used, the employer should be able to demonstrate that personal exposures are not higher in general than the concentrations at the static sampling locations in the work area in question (see para 95) or that the ratio of static to personal sampling results is fairly constant so that an estimate of personal exposure can be made. Supplementary checks using personal sampling should be made periodically.

95 For the purposes of air monitoring, the total number of exposed employees should be divided into groups of persons doing identical or similar work in well-defined work areas. A work area may be the whole or part of one room. Groups of persons doing the same work but in different rooms or buildings should be treated separately.

96 Where air monitoring is done by personal air sampling technique, the number of persons to be sampled in each group during each assessment will vary according to different work circumstances, but should not be less than one for every 10 persons exposed. The group should be as near homogeneous as possible with regard to exposure risk and the persons to sample should be selected at random.

97 Where air monitoring is done mainly by static sampling, the number and location of sampling points in each work area should be such that the results as a whole provide a good description of the degree of control of airborne lead in that area. The sampling points should be located at average head height as near as possible to job stations, or, failing this, near major sources of the airborne lead to which persons in that work area are exposed. Due consideration should be given to the direction of air currents in the work area in relation to sources of dust or fume and to job stations when siting the static samplers.

98 Air monitoring assessments should normally be undertaken for each group of employees or work area once every 2 months. A lower monitoring frequency (longer intervals) may be justified if:

(a) there is no material change in the work and the conditions of exposure, and
(b) the mean time weighted average for the group or work area is less than 0.1 mg/m^3, and/or
(c) the variations between groups or work areas and the variations between assessments are low.

In either of these cases the alternative monitoring frequency to be adopted may be agreed, on the basis of an appraisal of air sampling data and of other factors, between the employer and representatives of employees. The monitoring frequency in any case should not be lower than once in every period of 12 months.

99 The air monitoring procedures should be reviewed at intervals. The procedures may be modified with respect to the monitoring frequency, or with respect to the number of samples obtained for each group or work area on each assessment, if the accumulated body of data from air monitoring (and biological testing) up to the time of review indicates that modifications would be justified. In addition the air monitoring procedures may have to be modified whenever there are changes in plant, processes, work methods or dust and fume control provisions which are liable to result in variations in airborne lead concentrations.

100 Where lead alkyls are manufactured and handled in concentrated form, techniques for monitoring using continuous sampling have been adopted and such monitoring should be continued without consideration of the foregoing paragraphs (from paras 94 to 99). Where concentrated lead alkyls are blended into gasoline, such monitoring should not normally be required so long as adequate industrial procedures designed to prevent lead absorption are followed; however where lead alkyls are manufactured continuous sampling techniques should always be used.

101 Monitoring by routine air sampling may not be possible for jobs in which exposures are intermittent, that is where exposures are not on a routine daily or weekly basis. Nevertheless, in such cases steps should be taken to ensure that if the exposures are significant, they are adequately monitored.

102 Routine air monitoring may not be necessary where it is clearly established that respiratory protective equipment has to be worn for certain jobs where provisions for the control of releases of airborne lead cannot, on their own, provide adequate protection. Examples of such jobs are certain car discing processes and jobs involving entry into confined spaces.

Medical surveillance and biological tests

Regulation 16

(1) Every employer shall secure that each of his employees who is employed on work which exposes that employee to lead is under medical surveillance by an employment medical adviser or appointed doctor if either—
(a) the exposure of that employee to lead is significant; or
(b) an employment medical adviser or appointed doctor certifies that the employee should be under medical surveillance;
and where the employment medical adviser or appointed doctor has certified that in his opinion the employee should not be employed on work which exposes him to lead or that he should only be so employed under the conditions specified in the certificate the employer shall not expose that employee to lead except under the conditions, if any, specified in the certificate.

(2) Every employee who is exposed to lead at work shall, when required by the employer, present himself, during his normal working hours, for such medical examination or biological tests as may be required for the purposes of paragraph (1)

(3) In this Regulation—
"medical surveillance" includes biological tests;
"employment medical adviser" means an employment medical adviser appointed under section 56 of the Health and Safety at Work etc. Act 1974;
"appointed doctor" means a registered medical practitioner who is appointed in writing by the Health and Safety Executive for the purposes of this Regulation.

103 The medical surveillance of lead workers once consisted solely of routine clinical examination. Biological monitoring by means of a variety of tests is now a normal part of the medical surveillance. The purpose of the tests is to measure the amount of lead absorbed by an individual or its biological effects. Accepted biological criteria can be used to establish when preventative action needs to be taken to keep lead absorption within clearly established limits.

104 The objectives of medical surveillance should be:
(a) to make an initial assessment of fitness to undertake work with lead;
(b) to evaluate the effect of lead absorbed by persons exposed to lead at work;
(c) to assess the fitness of an employee to continue in work with lead;
(d) to enable remedial action to be taken before the development of adverse effects.

105 Medical surveillance should be carried out wherever exposure to lead is significant (see para 10).

106 Factors to be taken into account by the employment medical adviser or appointed doctor when considering whether medical employment medical surveillance should be required under Regulation 16(1)(b) should include the type of work and the prevailing personal hygiene standards, and any other information which might be available to indicate that lead is being absorbed. Where there is evidence that the blood lead level of workers is greater than 40 µg/100 ml the workers concerned will normally be under medical surveillance. Certain work, such as the mixing and application of lead powders and paints in badge enamelling or decorative painting, could result in increased lead absorption if the method of work is not strictly controlled and supervised to ensure that lead is not ingested from contaminated hands or lips and if a high standard of personal hygiene is not observed.

107 The medical surveillance and biological tests required for persons exposed to lead and lead compounds except lead alkyls should be in accordance with paras 111 to 118 and for lead alkyls should be in accordance with paras 119 to 125.

108 The employment medical adviser or appointed doctor will ensure that, as a normal part of medical surveillance, he informs:

(a) the person subject to that surveillance of the results and significance of his clinical assessment and/or biological tests as soon as possible in cases where the results are unsatisfactory and in other cases where the person examined requests such information;

(b) the employer forthwith of the names of persons whom he has certified as unfit for exposure to lead or fit only under specified conditions and, where medical surveillance is carried out by an appointed doctor, the appointed doctor should within 7 days of certifying any person as unfit notify that certification in writing by forwarding a copy of the appropriate record (see para 131) to the employment medical adviser so that the enforcing authorities can be alerted. He should also advise the employment medical adviser of any unsatisfactory trends or matters of concern.

109 The employment medical adviser or appointed doctor will also supply or make available in writing to the employer the biological test results for all persons where the individuals concerned consent but, in any case, the employer will always be advised of the results in sufficient detail for him to assess the levels of absorption so that adverse trends in groups or individuals may be countered or adverse conditions rectified.

110 Adequate facilities should be made available for undertaking medical examinations and blood/urine sampling. The facilities should comprise a room which is properly cleaned, adequately warmed, well ventilated, suitably furnished and provided with a wash-basin equipped with hot and cold running water, soap and a clean towel. If it is not reasonably practicable to provide hot and cold running water, then a supply of warm water should be provided. The room should be set aside for the exclusive purpose of medical surveillance whenever it is required. Where the number of employees to be examined is substantial and where reasonably practicable, a suitable waiting area should be provided. In addition, suitable sanitary accommodation should be provided for employees who may be required to provide specimens of their urine for biological testing.

Lead and lead compounds except lead alkyls

111 An initial medical assessment should be carried out before or within 14 days of a person commencing for the first time work which significantly exposes him to lead and should consist of:

(a) consideration of the medical and occupational history;

(b) clinical assessment;

(c) measurement of blood lead and haemoglobin concentrations and, where indicated, other relevant biological tests.

The employer should notify the employment medical adviser/appointed doctor of the name of each person newly employed or whom he is intending to employ on work which significantly exposes him to lead so that the initial medical assessment can be carried out at the appropriate time.

112 Subsequently periodic medical assessments should be carried out which should consist of:

(a) measurement of blood lead concentration, except as provided for in Category B in para 115;

(b) where indicated other relevant biological tests;

(c) at least once a year a clinical assessment;

(d) at least once a year a measurement of haemoglobin concentration.

113 The frequency of an individual's blood lead measurements for the purposes of periodic medical assessment should be once every 3 months.

114 In cases where there is likelihood of rapid absorption of lead, e.g. a person engaged on lead burning processes where exposure to fume can be high, the frequency of measurement may need to be increased and should be determined by the employment medical adviser/appointed doctor.

115 In other cases where a pattern of blood lead concentrations has been established such that absorption levels may be predicted given a person's continued employment under the same or similar conditions, the frequency of measurement may be modified as given below.

Category	*Blood lead* µg/100 ml	*Maximum interval between blood lead measurement*
A	under 40	12 months
B	40–59	6 months
C	60–69	3 months
D	70 and over	at the doctor's discretion but not more than 3 months

1 µg/100 ml = 0.048 µmol/litre

Category A	indicates that the absorption of lead due to occupational exposure is reasonably well controlled. The interval between blood lead measurements should not however be longer than 6 months unless on the previous two consecutive occasions on which air monitoring was carried out measurement of the airborne lead to which that person was exposed was less than 0.1 mg/m^3.
Category B	indicates that lead is being absorbed due to occupational exposure to lead. For employees in this category other suitable biological tests may be carried out as an alternative to blood lead measurement provided that a blood lead measurement is carried out at least once every 12 months. Suitable biological tests include measurement of erythrocyte protoporphyrins, aminolaevulinic acid dehydratase, urinary coproporphyrins and aminolaevulinic acid.
Category C	represents the level at which the employee should come under direct medical surveillance in that a clinical assessment and any other relevant biological tests will be carried out as soon as possible after the blood lead level has been established. The clinical examination may be deferred until a repeat determination of the blood lead level undertaken within 1 month shows that the value of 60 µg/100 ml blood continues to be exceeded.
Category D	represents the level above which the employment medical adviser/appointed doctor will certify the employee as unfit for work which exposes him to lead.

116 Any person whose blood lead concentration is equal to or greater than 70 µg/100 ml will have the test repeated, and if the result of the repeat test is equal to or greater than 70 µg/100 ml will be certified by the employment medical adviser/appointed doctor as unfit for work which exposes him to lead unless:

(a) at the time the Regulations came into force he had been employed on work which exposed him to lead for at least 20 years, or is aged 40 years or more and has been employed on such work for at least 10 years, in which case special consideration may be given as to the appropriate action, or

(b) the blood lead level is less than 80 µg/100 ml and the ALAU level remains lower than 20 mg/g creatinine or the ZPP level remains lower than 20 µg/g haemoglobin or the ALAD level remains greater than 6 European units (see Appendix 3).

When a person is certified as unfit for work which exposes him to lead he should be suspended from such work by his employer. He should not return to work which exposes him to lead until the employment medical adviser/appointed doctor considers him fit to return to the work from which he was suspended except that, at the discretion of the employment medical adviser/appointed doctor, he may return to work where exposure to lead is not significant.

117 The employment medical adviser/appointed doctor may certify as unfit for work which exposes him to lead a person whose blood lead concentration is less than 70 µg/100 ml if the results of other biological tests and/or clinical assessment indicate a need for suspension. Permission to return to work which exposes him to lead should be given in accordance with para 116.

118 In order to safeguard a developing foetus a woman of reproductive capacity who is employed on work which exposes her to lead and is subject to medical surveillance under Regulation 16:

(a) should be suspended from work which exposes her to lead when her blood lead concentration exceeds 40 µg/100 ml;

(b) should notify her employer as soon as possible if she becomes pregnant;
(c) once pregnancy has been notified and the employment medical adviser/appointed doctor informed, should, on the advice of the employment medical adviser/appointed doctor and in accordance with the conditions set out in Regulation 16, be suspended from work which exposes her to lead.

Permission to return to work which exposes her to lead should be given in accordance with para 116.

Concentrated lead alkyls

119 The initial medical assessment should be carried out before or within 14 days of a person commencing for the first time work which significantly exposes him to lead and should consist of:
(a) consideration of the medical and occupational history;
(b) clinical assessment;
(c) measurement of urinary and blood lead concentrations and, where indicated, other relevant biological tests.

The employer should notify the employment medical adviser/appointed doctor of the names of all persons newly employed or whom he is intending to employ in work with concentrated lead alkyls so that the initial medical assessment can be carried out at the appropriate time.

120 The periodic medical assessments should consist of:
(a) measurement of urinary lead concentration;
(b) where indicated, a clinical assessment and/or other relevant biological tests.

121 The interval between periodic urinary lead measurements should be determined as follows:

Category	*Urinary lead* µg/litre	*Maximum interval between urinary lead measurement*
A	under 120	6 weeks
B	120–149	1 week
C	150 and over	at the doctor's discretion

1 µg/litre = 0.0048 µmol/litre

Category B represents the level at which the employee will come under closer medical surveillance.

Category C represents the level above which the employment medical adviser/appointed doctor will certify the employee as unfit for work which exposes him to lead.

122 At least once a year the medical assessment should consist of the measurement of blood lead as well as of urinary lead concentrations and, where indicated, a clinical assessment. Action to be taken on the results of the blood lead measurements should be as described in paras 115 and 116.

123 Any person whose urinary lead concentration is equal to or greater than 150 µg/litre will have the test repeated and if the result of the repeat test is equal to or greater than 150 µg/litre will be certified as unfit for work which exposes him to lead. When a person is certified as unfit for work which exposes him to lead he should be suspended from such work by his employer. He should not return to work which exposes him to lead until the employment medical adviser/appointed doctor considers him fit to return to the work from which he was suspended, except that, at the discretion of the employment medical adviser/appointed doctor, he may return to work where exposure to lead is not significant.

124 The employment medical adviser/appointed doctor may certify as unfit for work which exposes him to lead a person whose urinary lead concentration is less than 150 µg/litre if the results of other biological tests and/or clinical assessment indicate a need for suspension. Permission to return to work should be accordance with para 123.

125 Where jobs likely to give rise to exposure to concentrated lead alkyls are carried out infrequently, e.g. inspections by managerial or technical employees or cleaning of leaded gasoline tanks by contractors, the frequency of medical assessment should be determined by the employment medical adviser/appointed doctor.

Records

Regulation 17

(1) Every employer shall—
  (a) ensure that adequate records are kept of the assessments, maintenance, air monitoring, medical surveillance and biological tests required by Regulations 4, 14, 15 and 16 respectively;
  (b) make those records available for inspection by employees, except that this sub-paragraph shall not apply to the health record of an identifiable individual.

(2) An entry in the records shall be kept for 2 years from the date on which the entry was made, except in the case of an entry relating to an assessment made under Regulation 4 which shall be kept until whichever is the earlier of the following dates—
  (a) 2 years from the date on which that assessment was revised;
  (b) 2 years from the date on which the work to which that assessment related ceased.

126 The records should enable persons other than those who carry out the work of assessment, maintenance, air and biological monitoring to:
(a) ascertain whether the work has been done and completed by the appropriate time;
(b) be informed of any defects or matters requiring attention and of the remedial action taken;
(c) use the records as a measure of performance to enable improvements to be made to the controls where necessary, e.g. the results of air and biological monitoring could be used to discover shortcomings in controls and to identify trends in the absorption of lead by persons thus enabling remedial action to be taken;
(d) provide data for future research with a view to improving standards.

127 The format of the records should be determined in accordance with the employer's record-keeping system. Whatever format is chosen the records should be intelligible and readily available for inspection. They should be held at the premises where the work with lead is carried out. In cases where this is not possible, e.g. because of the itinerant nature of the work such as demolition work, the records should be kept at a designated office.

128 In order to be adequate all records should include, where relevant, the following information:
(a) name and address of employer;
(b) clear identification of:
  (i) the work activity in the case of assessment;
  (ii) the breathing apparatus and the job for which it is issued;
  (iii) the exhaust ventilation plant;
  (iv) the persons to whom the air and biological monitoring relates;
(c) the date of the assessment, maintenance, air monitoring and biological monitoring;
(d) the results:

(i) of assessment	(1) significant or otherwise; (2) results of any analysis of samples; (3) lead-in-air concentrations, biological values, if air and/or biological monitoring are carried out.
(ii) of breathing apparatus examination and test	satisfactory/unsatisfactory.

(iii) of thorough examination and test of exhaust ventilation equipment	(1) results of static pressure measurements; (2) air velocities when appropriate; (3) comparison of above with the design or other appropriate specification; (4) assessment of level of control together with lead-in-air results when obtained; (5) note on condition of plant: satisfactory/unsatisfactory.
(iv) of air monitoring	(1) name and job of person wearing personal sampler; (2) location of static sampler; (3) length of sampling time; (4) analytical results; (5) 8-hour time-weighted average; (6) interpretation, i.e. satisfactory/ unsatisfactory.
(v) of biological monitoring	the results of biological tests, in sufficient detail to enable adverse trends to be identified. (For the medical surveillance and biological test records of identifiable individuals—see paras 129 to 132).

(e) defects noted or remarks;
(f) action taken on defects with date;
(g) name, status and dated signature of persons conducting assessment, etc.

Records relating to medical surveillance

129 In the case of records of medical surveillance the employer should ensure that the basic details are recorded of all persons for whom medical surveillance is required under Regulation 16. A suitable form of record is given in Appendix 5.

130 The employment medical adviser/appointed doctor is to keep a health record sheet for each such person in a suitable form which should, in addition to the information given in para 129, include the following:
(a) reason for medical surveillance;
(b) dates of initial and periodic medical surveillance;
(c) results of clinical assessments if done;
(d) results of biological tests;
(e) action taken.

131 A record is also to be drawn up and given to the employer by the employment medical adviser/appointed doctor of persons whom they have certified as unfit or for whom conditions have been attached to their continuing employment in work exposing them to lead and which should give:
(a) the name of person;
(b) his job;
(c) the date of the medical assessment;
(d) certification that he is unfit for lead exposure;
(e) conditions specified for return to work with lead;
(f) the dated signature of the employment medical adviser/appointed doctor;
(g) authorisation by employment medical adviser/appointed doctor of fitness to return to work with lead.

This record should be used as the suspension record for the purposes of Regulation 16.

132 Once a year the appointed doctor is to submit to the local employment medical adviser information on the number of people under medical surveillance and a summary of the blood lead measurements.

Availability of records

133 The object of making records available for inspection should be to enable employees or their authorised representatives to share with the employer any information relevant to securing health so that employees can be informed of both satisfactory and unsatisfactory conditions.

134 Any representatives chosen, such as safety representatives, should receive adequate information and/or training about how records should be interpreted and how to distinguish the relative importance of the information which the records will reveal.

135 The form in which the records should be made available should be determined by the employer and the representatives. In certain cases, e.g. in small concerns, sight of all the records could be the most meaningful whereas in other cases, e.g. where there is extensive plant and a large number of employees, a summary based on the records could be preferable. Whatever form of presentation is used the employer should explain the significance of the records and results.

136 The term 'health record' as used in Regulation 17 should be interpreted as including the results of biological tests. The results of biological tests should be made available in the form of a summary which indicates the trends in lead absorption patterns without identifying individual levels.

137 Normally the records should be completed within 14 days of the time specified for doing the work. In the case of assessment a record of the initial assessment should be made before the work with lead commences. Where samples are taken and additional time is required for the analysis to be done then the results of the analysis may be added later and the assessment revised accordingly.

138 Arrangements should be made to enable records to be used and collated where appropriate so as to achieve the objectives outlined in para 126.

139 The records should be kept available for inspection for at least 2 years. It would be advantageous to keep them longer where this is possible as they could provide useful occupational hygiene data.

Appendix 1 The lead-in-air standard

(Reference to the lead-in-air standard is made in paras 10, 27, 28, 33 and 92 of the main body of the Code.)

1 The standard for lead-in-air is an 8-hour time-weighted average concentration:

Lead (except for tetraethyl lead)	(as Pb) 0.15 mg/m^3 of air
Tetraethyl lead	(as Pb) 0.10 mg/m^3 of air

When determining lead-in-air concentrations for comparison with the standard, appropriate methods as published by HSE, or other methods which have standards of accuracy equivalent to or better than those methods, should be used.

2 As the extent of lead absorption is related not only to the amount of lead present but also to factors such as composition, solubility, particle size and period of exposure, some departure from the lead-in-air standard may be allowed for the purposes of Regulations 6 and 7 provided that:

(a) there is sufficient information available from biological test results to indicate that the degree of lead absorption is at an acceptable level;

(b) 8-hour time-weighted average concentrations do not exceed three times the standard set out in para 1; and

(c) 40-hour time-weighted average concentrations do not exceed 0.15 mg/m^3 of lead-in-air.

To be valid for this purpose the biological tests should have been carried out on persons who do not wear respiratory protective equipment at work, are regularly employed in the workplace and work a standard week in that workplace. Evaluation of the lead-in-air results and biological test results in relation to working conditions should be made by an occupational hygienist or other competent person.

3 For the purpose of establishing whether or not the lead-in-air standard in para 1 has been exceeded sampling should be carried out in such a way that all lead-in-air measurements are representative of the time-weighted average exposure of workers to lead either over the 8-hour or the 40-hour period, whichever is appropriate.

Appendix 2 Definition of a low solubility inorganic lead compound

1 A low solubility inorganic lead compound is a compound which does not yield to dilute hydrochloric acid more than 5% of its dry weight as soluble lead compound, calculated as lead monoxide, when determined in the manner described in the standard test below. If a lead compound is dispersed in a liquid, e.g. pottery glaze, then the solid matter should be separated out by a suitable method, e.g. centrifuging, before applying the standard test and the results should be reported as a percentage of soluble lead, as lead monoxide, in the solid material. The standard test is as follows.

2 A weighted quantity of the material in the form in which it is used or processed which has been dried at 105 ±2 °C thoroughly mixed and completely passed through a sieve of 500 µm aperture size with a minimum of force is to be continuously stirred for 60 ±1 minutes at 23 ±2 °C with 1000 times its mass of 0.07 M hydrochloric acid. The pH of the hydrochloric acid should be monitored and maintained at its starting value by the addition of (1 + 1) hydrochloric acid. The solution should thereafter be allowed to stand for 60 ±1 minutes at 23 ±2 °C and then filtered before being analysed for lead by means of a suitable analytical technique such as atomic absorption spectrometry. This analysis should be carried out as soon as possible after the preparation of the extract and in any case within 4 hours.

3 In the case of liquid paint analysis it is required that the procedure which is described in more detail in BS 3900: Part B3: 1983 should be followed. This may also be referred to for general guidance on methodology for the analysis of materials other than liquid paints.

Appendix 3 Methods of measuring indicators referred to in paragraph 116

Blood lead; atomic absorption spectroscopy:

ALAU	Davis[1] or equivalent method.
ZPP	Haematofluorimetry[2] or equivalent method.
ALAD	European standardised method[3] or equivalent method.

[1] Davis, J. R. and Andelman, S. L. 'Urinary delta-aminolevulinic acid levels in lead poisoning. A modified method for the rapid determination of urinary delta-aminolevulinic acid using disposable ion-exchange chromatographic columns'. *Arch. Environ. Health*, **15**, 53–9 (1967).

[2] Blumberg, W. E., Eisinger, J., Lamola, A. A. and Zuckerman, D. M. 'Zinc protoporphyrin level in blood determination by a portable haematofluorimeter. A screening device for lead poisoning'. *J. Lab. Clin. Med.*, **89**, 712–23 (1977).

[3] (a) Council Directive 77/312/EEC of 29 March 1977 on biological screening of the population for lead. OJ No. L105, 28.4.1977, p.10 (Annex 111).
(b) Berlin, A. and Schaller, K. H. 'European Standardised method for the determination of delta-aminolevulinic acid dehydratase activity in blood'. 3. *Klin. Chem. Klin. Biochem.*, **12**, 389–90 (1974).

Appendix 4

The main relevant legislation on the control of pollution of the external environment

Legislation	*Responsible enforcing authority*
Air	
Health and Safety at Work, etc, Act 1974—Sections 3 and 5	HSE; District Councils in England and Wales; District and Islands Councils in Scotland.
Alkali, etc, Works Regulation Act 1906 and Orders made under that Act	HM Industrial Air Pollution Inspectorate in England and Wales; Industrial Pollution Inspectorate in Scotland.
Public Health Acts 1936 and 1961 Public Health (Recurring Nuisances) Act 1969 Public Health (Scotland) Act 1897 Clean Air Act 1956 and 1968 Control of Pollution Act 1974	District Councils in England and Wales; District and Islands Councils in Scotland.
Water	
Rivers (Prevention of Pollution) Act 1951–61 Rivers (Prevention of Pollution) (Scotland) Acts 1951 and 1965 Public Health (Drainage of Trade Premises) Act 1937 Public Health Act 1961 Water Resources Act 1963 Sewerage (Scotland) Act 1968	Water authorities in England and Wales In Scotland, Regional and Islands Councils for discharges to sewers and River Purification Authorities for streams and controlled waters.
Waste disposal	
Public Health Act 1936 Refuse Disposal (Amenity Act) 1978 Control of pollution Act 1974	County Councils in England District and Islands Councils in Scotland District Councils in Wales

Information about the application of these controls should be sought from the appropriate responsible authority. The Alkali Act requires the 'best practicable means' to be used for preventing emissions of lead to air from registrable works and for rendering such discharges as occur harmless and inoffensive. Guidance is given in the Chief Industrial Air Pollution Inspector's *Notes on Best Practicable means for Scheduled Lead Works.*

Appendix 5

Specimen record form

Record of person under medical surveillance because of exposure to lead

Surname______________________________

Forenames______________________________

Maiden name______________________________
(if applicable)

Permanent address______________________________
____
____

Year address is valid______________________________

Place of birth______________________________

Country of birth______________________________

NI number______________________________

day/month/year
Date of birth____________________Sex__________

NHS number______________________________
(if available)

Employer's name______________________________

Employer's address______________________________
____
____

Years exposed to lead before
starting in current employment______________________________

Date of first exposure to day/month/year
lead in current employment______________________________

Date of end of exposure to day/month/year
lead in current employment______________________________

FP name______________________________

FP telephone number______________________________

FP address______________________________
____
____

Appendix 6

Other legislation relevant to control of lead at work

Although the Control of Lead at Work Regulations 1980 is the principal piece of legislation designed to control occupational exposure to lead, certain restrictions contained in other legislation are still in force. Attention is, therefore, directed to the following provisions of the Factories Act 1961.

Section 74 Prohibition of employment of women and young persons in certain processes connected with lead manufacture.

Section 82 Notification of lead poisoning.

Section 128 Employment of women and young persons in places other than factories in processes connected with lead manufacture, or involving the use of lead compounds.

Section 131 Prohibition of employment of women and young persons in painting of buildings with lead paint.

Section 132 Supplementary provision and definitions.

In addition, the following Regulations contain restrictions on the employment of women, and young persons or children in certain processes.

Paints and Colours Manufacture Regulations 1907, Regulation 3.

Yarn (Dyed by Lead Compounds) Heading Regulations 1907, Regulation 2.

Vitreous Enamelling Regulations 1908, Regulation 7.

Tinning of Metal Hollow-ware, Iron Drums, and Harness Furniture Regulations 1909, Regulation 2.

Lead Smelting and Manufacture Regulations 1911, Regulation 10.

Electric Accumulator Regulations 1925, Regulation 1.

Pottery (Health and Welfare) Special Regulations 1950, Regulation 6.

Indiarubber Regulations 1922, Regulation 1.

Prohibitions on the use of glazes other than leadless glazes or low solubility glazes are contained in Regulation 4 of the Pottery (Health) Special Regulations 1947 and provisions for the handling of raw lead compounds are contained in the Pottery (Health and Welfare) Regulations 1950, Regulation 23.

Printed in the UK for HMSO by Hobbs the Printers of Southampton
(2779) Dd739665 C105 11/85 G3379